

**METHOD AND APPARATUS FOR PROVIDING
A DUAL CURRENT-PERPENDICULAR-TO-PLANE (CPP) GMR
SENSOR WITH IMPROVED TOP PINNING**

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ABSTRACT

A method and apparatus for providing a dual current-perpendicular-to-plane (CPP) GMR sensor with improved top pinning is disclosed. In the passive regions of the sensor, a tri-level biasing layer is formed proximate to the top self-pinned layer. The tri-level biasing layer includes a first metal oxide layer, a layer of $\alpha\text{-Fe}_2\text{O}_3$ and a second
10 metal oxide layer. The pinning of the top self-pinned layer is enhanced by the layer of $\alpha\text{-Fe}_2\text{O}_3$. The layer of $\alpha\text{-Fe}_2\text{O}_3$ pins the top portion of the pinned layer by providing higher coercivity (H_C) to the pinned layer.